

TOSHIBA PHOTOCOUPLER GaAs IRED & PHOTO-TRANSISTOR

TLP627A, TLP627A-2, TLP627A-4TELECOMMUNICATION
PROGRAMMABLE CONTROLLERS
DC-OUTPUT MODULE

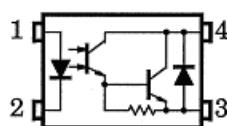
The TOSHIBA TLP627A, -2, and -4 consist of a gallium arsenide infrared emitting diode optically coupled to a darlington connected phototransistor which has a 350V high voltage of collector-emitter breakdown voltage.

The TLP627A-2 offer two isolated channels in a eight lead plastic DIP package, while the TLP627A-4 provide four isolated channels per package.

- Collector-Emitter Voltage : 350V(MIN)
- Current Transfer Ratio : 1500% (MIN)
- Isolation Voltage : 5000Vrms(MIN)

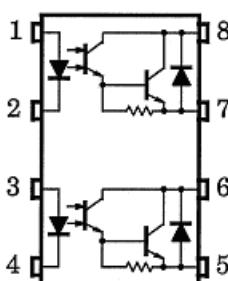
Pin Configuration (top view)

TLP627A



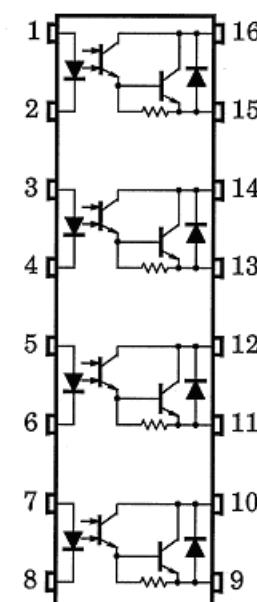
1 : ANODE
2 : CATHODE
3 : Emitter
4 : COLLECTOR

TLP627A-2



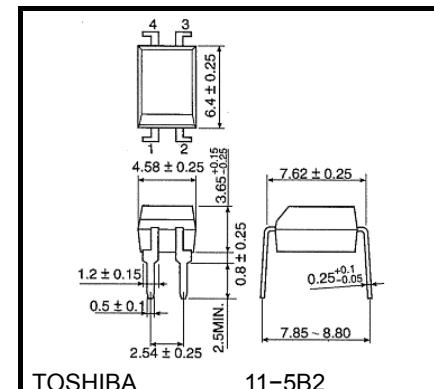
1, 3 : ANODE
2, 4 : CATHODE
5, 7 : Emitter
6, 8 : COLLECTOR

TLP627A-4

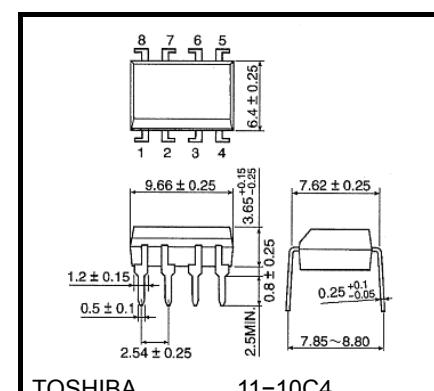


1, 3, 5, 7 : ANODE
2, 4, 6, 8 : CATHODE
9, 11, 13, 15 : Emitter
10, 12, 14, 16 : COLLECTOR

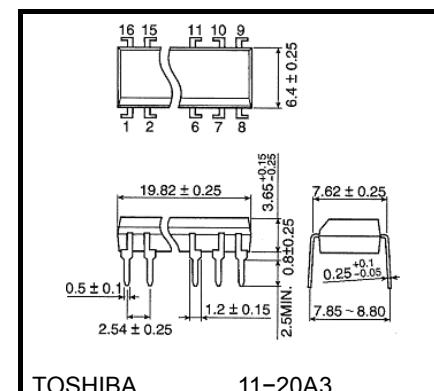
单位: mm



Weight : 0.26 g



Weight : 0.54 g



Weight : 1.1 g

Absolute Maximum Ratings (Ta = 25°C)

CHARACTERISTICS		SYMBOL	RATING		UNIT
			TLP627A	TLP627A-2 TLP627A-4	
LED	Forward Current	IF	60	50	mA
	Forward Current Derating	Δ IF /°C	-0.7 (Ta ≥ 39°C)	-0.5 (Ta ≥ 25°C)	mA /°C
	Pulse Forward Current	IFP	1 (100 μs Pulse, 100 pps)		A
	Reverse Voltage	VR	5		V
DETECTOR	Collector-Emitter Voltage	VCEO	350		V
	Emitter-Collector Voltage	VECO	0.3		V
	Collector Current	IC	150		mA
	Collector Power Dissipation (1 circuit)	PC	150 (300) (*)	100	mW
	Collector Power Dissipation Derating (Ta ≥ 25°C, 1 Circuit)	Δ PC /°C	-1.5 (-3.5) (*)	-1.0	mA /°C
Storage Temperature Range		Tstg	-55~125		°C
Operating Temperature Range		Topr	-55~100		°C
Lead Soldering Temperature		Tsol	260 (10 sec)		°C
Total Package Power Dissipation (1 circuit)		PT	250 (320) (*)	150	mW
Total Package Power Dissipation Derating (Ta ≥ 25°C, 1 circuit)		Δ PT /°C	-2.5 (-3.2) (*)	-1.5	mW /°C
Isolation Voltage		BVs	5000 (AC, 1 min, R.H. ≤ 60%) (**)		Vrms

Note: Using continuously under heavy loads (e.g. the application of high temperature/current/voltage and the significant change in temperature, etc.) may cause this product to decrease in the reliability significantly even if the operating conditions (i.e. operating temperature/current/voltage, etc.) are within the absolute maximum ratings.

Please design the appropriate reliability upon reviewing the Toshiba Semiconductor Reliability Handbook ("Handling Precautions"/"Derating Concept and Methods") and individual reliability data (i.e. reliability test report and estimated failure rate, etc.).

* : IF = 20 mA max

** : Device considered a two terminal device : LED side pins shorted together and DETECTOR side pins shorted together.

Recommended Operating Conditions

CHARACTERISTICS	SYMBOL	MIN.	TYP.	MAX.	UNIT
Supply Voltage	VCC	—	—	200	V
Forward Current	IF	—	16	25	mA
Collector Current	IC	—	—	120	mA
Operating Temperature	Topr	-25	—	85	°C

Note: Recommended operating conditions are given as a design guideline to obtain expected performance of the device. Additionally, each item is an independent guideline respectively. In developing designs using this product, please confirm specified characteristics shown in this document.

Individual Electrical Characteristics (Ta = 25°C)

CHARACTERISTICS		SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
LED	Forward Voltage	VF	IF = 10 mA	1.0	1.15	1.3	V
	Reverse Current	IR	VR = 5 V	—	—	10	μA
	Capacitance	CT	V = 0, f = 1 MHz	—	30	—	pF
DETECTOR	Collector-Emitter Breakdown Voltage	V (BR) CEO	IC = 0.1 mA	350	—	—	V
	Emitter-Collector Breakdown Voltage	V (BR) ECO	IE = 0.1 mA	0.3	—	—	V
	Collector Dark Current	ICEO	VCE = 300 V	—	10	200	nA
			VCE = 300 V, Ta = 85°C	—	—	20	μA
Capacitance Collector to Emitter		CCE	V = 0, f = 1 MHz	—	10	—	pF

Coupled Electrical Characteristics (Ta = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Current Transfer Ratio	I_C / I_F	$I_F = 1 \text{ mA}, V_{CE} = 1 \text{ V}$	1500	4000	—	%
Saturated CTR	$I_C / I_F (\text{sat})$	$I_F = 10 \text{ mA}, V_{CE} = 1 \text{ V}$	500	—	—	%
Collector-Emitter Saturation Voltage	$V_{CE} (\text{sat})$	$I_C = 15 \text{ mA}, I_F = 1 \text{ mA}$	—	—	1.0	V
		$I_C = 100 \text{ mA}, I_F = 10 \text{ mA}$	0.3	—	1.2	

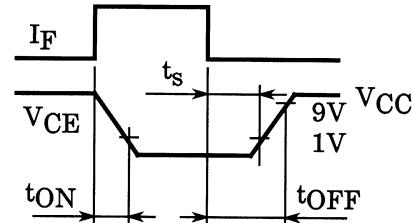
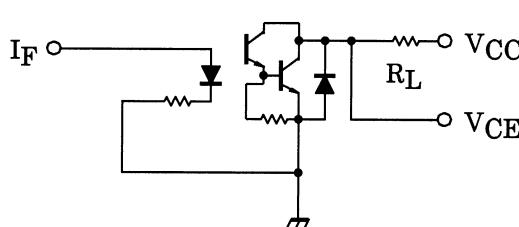
Isolation Characteristics (Ta = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Capacitance Input to Output	C_S	$V_S = 0, f = 1 \text{ MHz}$	—	0.8	—	pF
Isolation Resistance	R_S	$V_S = 500 \text{ V}, \text{R.H.} \leq 60\%$	5×10^{12}	10^{14}	—	Ω
Isolation Voltage	BVS	AC, 1 minute	5000	—	—	Vrms
		AC, 1 second, in oil	—	10000	—	
		DC, 1 second, in oil	—	10000	—	Vdc

Switching Characteristics (Ta = 25°C)

CHARACTERISTICS	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Rise Time	t_r	$V_{CC} = 10 \text{ V}$ $I_C = 10 \text{ mA}$ $R_L = 100 \Omega$	—	40	—	$\mu \text{ s}$
Fall Time	t_f		—	15	—	
Turn-on Time	t_{on}		—	50	—	
Turn-off Time	t_{off}		—	15	—	
Turn-on Time	t_{ON}	$R_L = 180 \Omega$ $V_{CC} = 10 \text{ V}, I_F = 16 \text{ mA}$	—	5	—	$\mu \text{ s}$
Strage Time	t_s		—	40	—	
Turn-off Time	t_{OFF}		—	80	—	

Fig.1: SWITCHING TIME TEST CIRCUIT



RESTRICTIONS ON PRODUCT USE

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- The information contained herein is subject to change without notice.
- TOSHIBA is continually working to improve the quality and reliability of its products. Nevertheless, semiconductor devices in general can malfunction or fail due to their inherent electrical sensitivity and vulnerability to physical stress. It is the responsibility of the buyer, when utilizing TOSHIBA products, to comply with the standards of safety in making a safe design for the entire system, and to avoid situations in which a malfunction or failure of such TOSHIBA products could cause loss of human life, bodily injury or damage to property.
In developing your designs, please ensure that TOSHIBA products are used within specified operating ranges as set forth in the most recent TOSHIBA products specifications. Also, please keep in mind the precautions and conditions set forth in the "Handling Guide for Semiconductor Devices," or "TOSHIBA Semiconductor Reliability Handbook" etc.
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